These properties are for everyday math.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Additive inverse** | | **a + (-a) =0** | | 7 + (-7) =0  -7 is the additive inverse of 7 | The additive inverse is the negative of the number. | |
| **Multiplicative inverse** | |  | | 3 x 1/3 = 1 | The multiplicative inverse of a rational number is it’s reciprocal. | |
| **Distributive property** | **a(b+c)=ab+ac** | |  | | | Multiplying a sum by some number is the same as multiplying each term by that same number. |

**Exponent Rules:**

|  |  |
| --- | --- |
| Rule: | Example: |
| *A-k =* 1/*Ak* | 2-3 = 1/(2×2×2) = 1/8 |
| *Ak*×*An* = *A*(*k*+*n*) | 32×33 = (3×3) × (3×3×3) = 3×3×3×3×3 = 35 |
| *Ak*/*An* = *A*(*k*-*n*) | 32/33 = (3×3) / (3×3×3) = 1/3 = 3-1 |
| (*Ak*)*n* = *A*(*k*×*n*) | (32)3 = (3×3) × (3×3) × (3×3) = 3×3×3×3×3×3 = 36 |
| CHALLENGE:  http://www.algebralab.org/img/0884ece8-0146-456b-847d-3c910f63ebd0.gif  Using [order of operations](javascript:def('/Glossary/glossaryterm.aspx?word=Order%20of%20Operations',%20500,%20500);) tells us that we should do what is inside the parentheses first and then deal with the exponent. To simplify within the parentheses involves working with several rules including the rule for negative exponents. | |

**Digging for Roots:**

If you want to have your calculator take the square root of something it’s pretty straightforward once you’ve found the  button. Taking higher roots of a number, however, often require that you know the rule illustrated below.



Example: For the cube root of 125 - you could plug the following into your calculator:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 125^(1/3) | [enter] | **OR** | 125^(0.3333) | [enter] |
| = 5 |  | = 5 |  |

**Factoring**

Assume 12x+6 is the result of distribution. What did it look like before the distribution was done?

There was something outside a set of parenthesis and two terms inside the parenthesis.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | ( |  | + |  | ) |
|  |  |  |  |  |  |
| 6 | ( | 2x | + | 1 | ) |

Separating an expression so that the smallest possible pieces called factors multiply together to get the original expression is called **factoring**.

Look at each term and find the largest factor that is in all terms.

Example: Find the largest number that divides evenly into 72, 60 and 36.

|  |  |
| --- | --- |
| This number goes in front of the parenthesis.  Divide each term by the common factor. |  |
| Fill in the positions in the parenthesis. Distribute to check the factoring. | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 12 | ( |  | + |  | + |  | ) | |  |  |  |  |  |  |  |  | | 12 | ( | 6x2 | + | 5x | + | 3 | ) | |

 The largest factor in all terms is 8xy. When the division is done there shouldn’t be any negative exponents. Notice the negative in the third term.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Divide each term by the common factor. | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 8xy | ( |  | + |  | - |  | ) | |  |  |  |  |  |  |  |  | | 8xy | ( | 3xy | + | 2x | - | 7y | ) | |
| The division can be done in your head, but some students need to write it down. | |

CHALLENGE:

|  |  |
| --- | --- |
| Hint: Factor out a ¼. |  |